

AMENDMENT

(Amendment Based on Article 11)

To: The Examiner of the Japanese Patent Office

1. Identification of the International Application

PCT/JP03/08332

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4. Item to be amended: Claims

5. Contents of Amendment:

- (1) The expression "a mold whose cavity is designed to set the shrinkage ratio of said resin molded article into a range of between 4.5/1000 and 6.6/1000," on page 37 line 6 in Claim 1 should be amended as "a mold whose cavity is designed to set X direction, Y direction, and Z direction molding shrinkage ratios of said resin molded article to be the same value each into a range of between 4.5/1000 and 6.6/1000,".
- (2) The expression "a mold whose cavity is designed to set the shrinkage ratio of said resin molded article into a range of between 4.5/1000 and 6.7/1000," on page 37 line 17 in Claim 2 should be amended as "a mold whose cavity is designed to set X direction, Y direction, and Z direction molding shrinkage ratios of said resin molded article to be the same value each into a range of between 4.5/1000

[Table 2]

Resin = ABS Table 2-1		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.2

Resin = ABS Table 2-2		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.8

Resin = ABS Table 2-3		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.2

Resin = ABS Table 2-4		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	15
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.5

Resin = ABS Table 2-5		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.8

Resin = ABS Table 2-6		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	65
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.0

Resin = ABS Table 2-7		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.4

Resin = ABS Table 2-8		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	45
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.6

Resin = ABS Table 2-9		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	120
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.2

Resin = ABS Table 2-10		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	45
Gas pressure	Mpa	10
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.6

Resin = ABS Table 2-11		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	45
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.7

Resin = ABS Table 2-12		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	45
Gas pressure	Mpa	45
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.7

{Table 3}

Resin = HIPS Table 3-1		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.2

Resin = HIPS Table 3-2		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.2

Resin = HIPS Table 3-3		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.7

Resin = HIPS Table 3-4		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	15
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.8

Resin = HIPS Table 3-5		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.9

Resin = HIPS Table 3-6		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	65
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.2

Resin = HIPS Table 3-7		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.6

Resin = HIPS Table 3-8		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	45
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.9

Resin = HIPS Table 3-9		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	120
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.2

Resin = HIPS Table 3-10		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	45
Gas pressure	Mpa	10
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.8

Resin = HIPS Table 3-11		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	45
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.9

Resin = HIPS Table 3-12		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	45
Gas pressure	Mpa	38
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.9

[Table 4]

Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X, Y, Z)	%	5.5

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.8

Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.4

Item	Unit	Value in Practice
The temperature of the melted resin	°C	245
The temperature of the mold	°C	15
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.5

Item	Unit	Value in Practice
The temperature of the melted resin	°C	245
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.7

Item	Unit	Value in Practice
The temperature of the melted resin	°C	245
The temperature of the mold	°C	65
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.1

Item	Unit	Value in Practice
The temperature of the melted resin	°C	245
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Clasp pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.5

Resin = modified PPE		Table 4-8
Item	Unit	Value in Practice
The temperature of the melted resin	°C	245
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	45
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.8

Resin = modified PPE		Table 4-9
Item	Unit	Value in Practice
The temperature of the melted resin	°C	245
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	120
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio	%	(X, Y, Z)

Item	Unit	Value in Practice
The temperature of the melted resin	°C	245
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	45
Gas pressure	Mpa	10
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.6

Resin = modified PPE		Table 4-11	
Item	Unit	Value in Practice	
The temperature of the melted resin	°C	245	
The temperature of the mold	°C	35	
Injection pressure	%	70	
Injection speed	%	70	
Cooling time of the inside of the mold	sec	45	
Gas pressure	Mpa	25	
Gas injection position		Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.6	

Item	Unit	Value in Practice
The temperature of the melted resin	°C	245
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	45
Glass pressure	Mpa	40
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	‰	5.6

Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (% V/A)	%	6.8

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio	%	7.0

Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio X (%)	%	7.3

Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	15
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio	%	6.7

Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio $\frac{V_2}{V_1} \times 100$	%	6.8

Resin = HIPS Foaming agent = AC ¹		Table 6-6
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	65
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio	%	7.3

Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio $\Delta V/V_0$	%	7.3

Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	180
Molding Shrinkage ratio (ΔV/V ₂)	%	7.1

Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	360
Molding Shrinkage ratio (X V Z)	%	6.6

Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (25 °C/20 °C)	%	6.9

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (°C × 2)	%	7.0

Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (X Y Z)	%	7.3

Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	15
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (25°C/20°C)	%	6.8

Item	Unit	Value in Practice
The foaming agent of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (2 × 2)	%	6.8

Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	65
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio $\alpha \times V_2$	%	7.2

Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (X Y Z)	%	7.3

Resin = HIPS		Table 6-17
Foaming agent = Sodium hydrogen carbonate		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	180
Molding Shrinkage ratio $\phi \times Y \times Z$	%	7.0

Item	Unit	Value in Practice
The temperature of the molched resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	360
Molding Shrinkage ratio (X,Y,Z)	%	6.7

[Table 7]

Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (X%)	%	6.7

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio	%	6.9

Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio of PC/Zn	%	7.1

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	15
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio of PC + Zn	%	7.0

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (ΔV/V ₂)	%	7.1

Item	Unit	Value in Practice
The temperature of the medical resin	°C	230
The temperature of the mold	°C	65
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (X % Z)	%	7.3

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio $\alpha \times Y \times Z \%$	%	6.8

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	180
Molding Shrinkage ratio (X Y Z %)	%	6.7

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	360
Molding Shrinkage ratio $\frac{L \times Y \times Z}{L_0 \times Y_0 \times Z_0}$	%	6.5

Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio ($\gamma \times \gamma \times \gamma$)	%	6.6

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (±%)	%	6.9

Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio	%	7.0

Item	Unit	Value in Practice
The temperature of the molten resin	°C	230
The temperature of the mold	°C	15
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (X % Z)	%	6.9

Item	Unit	Value in Practice
The temperature of the molten resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (ΔV/V ₂)	%	7.1

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	65
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (X Y Z)	%	7.4

Item	Unit	Value in Practice
The temperature of the molten resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio of PC/Zn	%	6.8

Item	Unit	Value in Practice ^a
The temperature of the melted resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	180
Molding Shrinkage ratio (ΔV/V ₂)	%	6.8

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	360
Molding Shrinkage ratio (X Y Z)	%	6.5

[Table 8]

Resin = AES
Foaming agent = AC

Table 8-1

Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (X,Y,Z)	%	6.9

Resin = AES
Foaming agent = AC

Table 8-2

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (X,Y,Z)	%	6.8

Resin = AES
Foaming agent = AC

Table 8-3

Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (X,Y,Z)	%	7.0

Resin = AES
Foaming agent = AC

Table 8-4

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (X,Y,Z)	%	6.7

Resin = AES
Foaming agent = AC

Table 8-5

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (X,Y,Z)	%	6.8

Resin = AES
Foaming agent = AC

Table 8-6

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	65
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (X,Y,Z)	%	7.1

Resin = AES
Foaming agent = AC

Table 8-7

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	90
Molding Shrinkage ratio (X,Y,Z)	%	7.3

Resin = AES
Foaming agent = AC

Table 8-8

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	180
Molding Shrinkage ratio (X,Y,Z)	%	7.0

Resin = AES
Foaming agent = AC

Table 8-9

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	35
Injection pressure	%	99
Injection speed	%	99
Cooling time of the inside of the mold	sec	360
Molding Shrinkage ratio (X,Y,Z)	%	6.8

[Table 9]

Resin = ABS			Table 9-1
Item	Unit	Value in Practice	
The temprature	°C	230	
The temprature	°C	45	
Injection presssure	%	70	
Injection speed	%	70	
Holding presssure	%	25	
Holding time	sec	3	
Cooling time	sec	25	
Molding Shrinkage ratio	X axis direction	%	5.2 to 5.4
	Y axis direction	%	5.3 to 5.6
	Z axis direction	%	6.2 to 6.9

Resin = modified PPE			Table 9-2
Item	Unit	Value in Practice	
The temprature	°C	210	
The temprature	°C	45	
Injection presssure	%	70	
Injection speed	%	70	
Holding presssure	%	25	
Holding time	sec	3	
Cooling time	sec	25	
Molding Shrinkage ratio	X axis direction	%	5.4 to 5.8
	Y axis direction	%	5.2 to 5.5
	Z axis direction	%	6.1 to 6.9

Resin = HIPS			Table 9-3
Item	Unit	Value in Practice	
The temprature	°C	240	
The temprature	°C	45	
Injection presssure	%	70	
Injection speed	%	70	
Holding presssure	%	25	
Holding time	sec	3	
Cooling time	sec	25	
Molding Shrinkage ratio	X axis direction	%	5.4 to 5.7
	Y axis direction	%	5.3 to 5.5
	Z axis direction	%	6.2 to 7.0

Resin = PC/ABS			Table 9-4
Item	Unit	Value in Practice	
The temprature	°C	230	
The temprature	°C	45	
Injection presssure	%	70	
Injection speed	%	70	
Holding presssure	%	25	
Holding time	sec	3	
Cooling time	sec	25	
Molding Shrinkage ratio	X axis direction	%	5.0 to 5.3
	Y axis direction	%	4.9 to 5.1
	Z axis direction	%	5.6 to 6.5

[Table 10]

Resin = PC/ABS Table 10-1		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.1

Resin = PC/ABS Table 10-2		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.7

Resin = PC/ABS Table 10-3		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.4

Resin = PC/ABS Table 10-4		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	15
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.4

Resin = PC/ABS Table 10-5		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.6

Resin = PC/ABS Table 10-6		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	65
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.9

Resin = PC/ABS Table 10-7		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.6

Resin = PC/ABS Table 10-8		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	45
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.7

Resin = PC/ABS Table 10-9		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	120
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.2

Resin = PC/ABS Table 10-10		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	45
Gas pressure	Mpa	10
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.7

Resin = PC/ABS Table 10-11		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	45
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.8

Resin = PC/ABS Table 10-12		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	210
The temperature of the mold	°C	35
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	45
Gas pressure	Mpa	38
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.8

[Table 11]

Resin = ABS Table 11-1		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.2

Resin = ABS Table 11-2		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.9

Resin = ABS Table 11-3		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.2

Resin = HIPS Table 11-4		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.2

Resin = HIPS Table 11-5		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.2

Resin = HIPS Table 11-6		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.9

Resin = modified PPE Table 11-7		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.6

Resin = modified PPE Table 11-8		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.8

Resin = modified PPE Table 11-9		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.4

Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position		Cavity
Molding Shrinkage ratio	%	5.2

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (ΔX/Y,Z)	%	5.8

Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position		Cavity
Molding Shrinkage ratio (X,Y,Z)	%	6,3

Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	MPa	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position		Cavity
Molding Shrinkage ratio $\frac{V_0}{V} \times 100\%$	%	5.1

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gass pressure	Mpa	25
Gas injection position		Cavity
Molding Shrinkage ratio (ΔX/Y,Z)	%	5.9

Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio $\Delta X / X_0$	%	6.2

Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position		Cavity
Molding shrinkage ratio	%	5.2

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position		Cavity
Molding shrinkage ratio	%	5.8

Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position		Cavity
Molding shrinkage ratio °C/2A	%	
		6.1

Resin = HIPS in which St-g-BR is added		Table 12-10
Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position		Cavity
Molding Shrinkage ratio × V, %	%	
		5.1

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position		Cavity
Molding Shrinkage ratio C.V. %	%	6.2

Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position		Cavity
Molding Shrinkage ratio $\times 10^{-3} \%$	%	6.9

Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Injection position		Cavity
Molding Shrinkage ratio (X Y Z)	%	5.1

Resin = HIPS in which St-g-EPDM is added		Value in Practice
Item	Unit	
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position		Cavity
Molding Shrinkage ratio (X,Y,Z)	%	6.1

Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Cave pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio 4X.Y.Z	%	6.8

Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position		Cavity
Molding Shrinkage ratio X % X Z	%	5.2

Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position		Cavity
Molding Shrinkage ratio (X V Z)	%	6.2

Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position		Cavity
Molding Shrinkage ratio ($\Delta X/Y, Z$)	%	7.0

[Table 13]

Resin = PPE modified HIPS in which St-g-B is added		
Item	Unit	Value in Practice
The temperature of the melting resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.5

Resin = PPE modified HIPS in which St-e-B is added		
Item	Unit	Value in Practice
The temperature of the melting resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.7

Resin = PPE modified HIPS in which St-e-B is added		
Item	Unit	Value in Practice
The temperature of the melting resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.6

Resin = PPE modified HIPS in which St-g-E is added		
Item	Unit	Value in Practice
The temperature of the melting resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.6

Resin = PPE modified HIPS in which St-e-E is added		
Item	Unit	Value in Practice
The temperature of the melting resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.7

Resin = PPE modified HIPS in which St-e-E is added		
Item	Unit	Value in Practice
The temperature of the melting resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.6

Resin = PPE modified HIPS in which Perprene P-150B is added		
Item	Unit	Value in Practice
The temperature of the melting resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.4

Resin = PPE modified HIPS in which		
Item	Unit	Value in Practice
The temperature of the melting resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	5.6

Resin = PPE modified HIPS in which		
Item	Unit	Value in Practice
The temperature of the melting resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	%	6.6

[Table 14]

Resin = ABS		
Table 14-1		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	% _m	5.2

Resin = HIPS		
Table 14-4		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	180
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	% _m	5.1

Resin = ABS		
Table 14-2		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	% _m	5.7

Resin = HIPS		
Table 14-5		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	230
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	% _m	6.3

Resin = ABS		
Table 14-3		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	% _m	6.3

Resin = HIPS		
Table 14-6		
Item	Unit	Value in Practice
The temperature of the melted resin	°C	265
The temperature of the mold	°C	45
Injection pressure	%	70
Injection speed	%	70
Cooling time of the inside of the mold	sec	15
Gas pressure	Mpa	25
Gas injection position	Cavity	
Molding Shrinkage ratio (X,Y,Z)	% _m	6.8